

U.S. Patent Appln. No. 10/781,379
Amendment
Reply to Office Action dated June 24, 2004

Docket No. 1625-171

REMARKS

The foregoing amendments and these remarks are in response to the Office Action dated June 24, 2004. This amendment is timely filed.

At the time of the Office Action, claims 1-11 were pending. In the Office Action, claims 1, 3, 4, 7-9 and 11 were rejected under 35 U.S.C. §102(b). Claim 10 was rejected under 35 U.S.C. §103(a). Claims 2, 5 and 6 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The rejections are set out in more detail below.

I. Rejections on Art

In the Office Action, claims 1, 3, 4, 7-9 and 11 were rejected under 35 U.S.C. §102(b) as being anticipated by Japanese Patent No. 2001-355513 to Urasawa et al. (Urasawa). Claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Urasawa.

Applicant notes that Urasawa discloses a Stirling cycle engine which has a casing 1 having a cylindrical shape. A cylinder 7 is made from metal, the cylinder 7 being coaxially inserted into the casing 1. A displacer 8 is slidably inserted into an inside of the cylinder 7 adjacent to a distal end thereof. A piston 15 is slidably inserted into the inside of the cylinder 7 adjacent to a proximal end thereof. A driving mechanism 16 for reciprocating the piston 15 is also included, the driving mechanism 16 being provided around an outer periphery of the cylinder 7 adjacent to the proximal end thereof. A plurality of mounts 28 are included for fixing the cylinder 7 within the casing 1 and supporting the driving mechanism 16, the plurality of mounts 28 being provided on the outer periphery of the cylinder 7 between the proximal and the distal ends thereof. A first flat spring 22 having a center portion thereof is connected to the piston 15. A plurality of connecting arms are also include, ends thereof being connected to one of the mounts 28 and the other ends thereof being attached to the first flat spring 22.

Applicant has amended claims 1 and 7 herein so as to clarify that "the cylinder, the plurality of mounts and the plurality of connecting arms are integrally formed into a single piece by casting". This amendment is fairly based on the specification as filed, and does not introduce new matter. Urasawa discloses a technique of forming the plurality of mounts 28 integrally with the cylinder 7, but Urasawa does not teach or suggest a technique of integrally molding the plurality of mounts 28 and the plurality of connecting arms. By the amendment made to claim 1,

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it is clear that the plurality of the connecting arms of the present claims are not connected to the mounts by screwing, as taught by Urasawa.

Urasawa does not include any detailed description concerning the plurality of connecting arms at all. According to FIG. 1 thereof it is presumed that the plurality of connecting arms are connected to the mounts 28 after penetrating through the driving mechanism 16. This presumption is supported by the fact that the driving mechanism 16 is formed by annularly winding the electromagnetic coil 19 around the laminated core 24, and it has essentially the same diameter as the main body 3. From the overall positional relationship between the connecting arms and the other components such as the electromagnetic coil 19, the laminated core 24 and the driving mechanism 16, it would be difficult to provide the plurality of connecting arms so as to have the most suitable overall positional relationship relative to the cylinder and the one of the mounts 28.

In contrast, and according to the invention defined in amended claim 11, however, the driving mechanism is formed in a shape so as to avoid a contact with the plurality of connecting arms in order to clearly denote the accuracy of the overall positional relationship between the cylinder, one of the mounts and the plurality of connecting arms. In fact, in the Stirling cycle engine defined in claim 11, the shape of the driving mechanism is determined in accordance with the plurality of connecting arms connected to one of the mounts with the most suitable positional relationship relative to one of the mounts. It is apparent from the structure that the radius of the driving mechanism is shorter than a distance from the center thereof to one connecting arm, as illustrated in FIG. 1 of this application. According to this embodiment, the reinforcing ribs are formed on each of the connecting arms along the circumferential direction (outer periphery of the driving mechanism) of the mount and the driving mechanism is formed such that its entire outer periphery is relatively small due to an ease of the manufacturing thereof, but the shape of the driving mechanism can be any form as long as it avoids a contact with the plurality of connecting arms. For instance, the driving mechanism may be decentered relative to the central axis of the Stirling cycle engine, while it may be formed with a concave portion or a penetration hole on a portion thereof adjacent to the plurality of connecting arms.

For the foregoing reasons, independent claims 1, 7 and 11 are believed in condition for allowance. The dependent claims are also believed allowable because of their dependence upon allowable base claims, and because of the further features recited.

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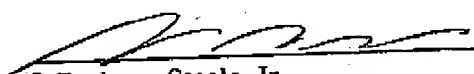
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II. Conclusion

Applicant has made every effort to present claims which distinguish over the prior art, and it is believed that all claims are in condition for allowance. Nevertheless, Applicant invites the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. In view of the foregoing remarks, Applicant respectfully requests reconsideration and prompt allowance of the pending claims.

Respectfully submitted,

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